ATTACHMENT 16

TANK SYSTEMS

Table of Contents

List of Tables

List of Acronyms

ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRA	Brine Reduction Area
CRO	Control Room Operator
DFS	Deactivation Furnace System
ECR	Explosive Containment Room
ECV	Explosive Containment Room Vestibule
ICU	Intermittent Containment Unit
LIC	Liquid Incinerator
MDB	Munitions Demilitarization Building
MDM	Multipurpose Demilitarization Machine
MPB	Munition Processing Bay
MPF	Metal Parts Furnace
NFPA	National Fire Protection Association
PAS	Pollution Abatement System
PDARS	Process Data Acquisition and Recording System
PLC	Programmable Logic Controller
RCRA	Resource Conservation Recovery Act
RSM	Rocket Shear Machine
SDS	Spent Decontamination System
TMA	Toxic Maintenance Area
TOCDF	Tooele Chemical Agent Disposal Facility
TOX	Toxic Cubicle
TSDF	Treatment Storage and Disposal Facility

16.1 INTRODUCTION

16.1.1 Tooele Chemical Agent Disposal Facility (TOCDF) manages liquid hazardous wastes in three different tank systems:

16.1.1.1 Agent Collection System (ACS): Consisting of ACS-TANK-101, ACS-TANK-102 and ancillary equipment (See Table 16-1 for design specifications). These tanks receive and accumulate the chemical agent that is drained from the munitions and bulk containers processed at the TOCDF. The collected agent is sent from the ACS tanks to the primary chamber of the Liquid Incinerators.

16.1.1.2 Spent Decontamination System (SDS): Consisting of SDS-TANK-101, SDS-TANK-102, SDS-TANK-103, and ancillary equipment (See Table 16-2 for design specifications). These tanks receive and accumulate spent decontamination solution generated within the Munitions Demilitarization Building (MDB) during maintenance activities. As solutions are sprayed over the area or equipment being decontaminated, spent solutions collect in double lined sumps (referred to as Intermittent Collection Units [ICU] because of the management constraints placed upon them through RCRA Permit conditions). From the ICU the spent decontamination solution is pumped to the SDS tanks. Spent decontamination solutions is sent from the SDS Tanks to the secondary chamber of the Liquid Incinerators. One SDS tank is left empty when chemical agent is being processed inside the MDB and is to be used as storage in case there is an agent spill.

16.1.1.3 Brine Reduction Area (BRA) Tank System: Consisting of BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, BRA-TANK-202, and ancillary equipment (See Table 16-3 for design specifications). The BRA tanks receive and accumulate spent scrubber brines generated by the Pollution Abatement Systems associated with the Liquid Incinerators, Metal Parts Furnace, and Deactivation Furnace System. From the BRA tanks, spent scrubber brine is either treated onsite in the BRA or transferred to tankers for transport to an offsite Treatment Storage and Disposal Facility (TSDF).

16.2 EXTERNAL CORROSION PROTECTION [40 CFR 264.192(a)(3) and 270.16(e)]

16.2.1 With the exception of the BRA tanks, which are located outside on concrete pads, all of the hazardous waste tanks are located inside and are not externally exposed to soil or precipitation. The exterior of the BRA tanks is painted for protection against atmospheric conditions. Flat-bottomed tanks that are permitted to store hazardous waste are supported above their respective concrete pads to allow for leak detection. All tanks are painted for protection from rusting and atmospheric conditions. Painting specifications and other information on external corrosion protection are maintained at the site, and are available for inspection upon request. The integrity of the tank systems is ensured by the corrosion protection coatings and inspections. The tanks are located above ground and are set on concrete pads or are elevated to assist in visual inspection.

16.2.2 Specifically, the ACS tanks are constructed of carbon steel and coated with an epoxy paint system on the outside surface. The SDS tanks are carbon steel tanks coated with an epoxy paint system on the outside surface. The BRA tanks are carbon steel tanks lined with modified epoxy and coated with the manufacturer's standard coating. ACS-TANK-102 and the SDS tanks are supported above the floor on epoxy-coated steel legs. ACS-TANK-101 is supported above the floor by steel supports attached to the first floor platform. The legs are supported above the floor on concrete pads. Small spills are decontaminated and flushed with water as quickly as practical. Any spills and wash down liquids will drain away from the tanks and support legs to the sumps. Because the tanks and steel support legs are not normally exposed to liquids, exterior corrosion measures, such as cathodic protection, are not necessary. The BRA tanks are supported above ground on a concrete pad. Spills are handled in the manner previously described.

16.3 DESCRIPTIONS OF FEED SYSTEMS, SAFETY CUTOFF, BYPASS SYSTEMS, AND PRESSURE CONTROL [40 CFR 264.194(b)(2) and 270.16(c)]

16.3.1 The following paragraphs discuss feed systems, safety cutoff, bypass systems and pressure control for the three tank systems. General information that is applicable to more than one system is given, as well as specific information for the ACS, SDS, and BRA tanks. These controls are described further in the Piping and Instrumentation Diagram drawings that are included in Attachment 11 (General Facility Drawings) of this Permit.

16.3.2 Common Tank Components

16.3.2.1 The following description applies to the two tanks for agent collection, ACS-TANK-101 and -102; the three tanks for spent decontamination solution, SDS-TANK-101, -102, and -103; and the four tanks for brine, BRA-TANK-101, -102, -201, and -202.

16.3.2.2 All of the tanks have a level transmitter that provides both low- and high-level alarms to the Process Data Acquisition and Recording System (PDARS). A listing of the instruments for the tanks, piping, and valving follows:

16.3.2.2.1 Tank level transmitters[1] indicating an alarm at low-level and high-level.

16.3.2.2.2 Tank level switches indicating an alarm at low-low level and high-high level.

16.3.2.2.3 Valve position switches.

16.3.2.2.4 Strainer differential pressure transmitters are part of the Agent and Spent Decontamination Tank Systems.

16.3.2.2.5 Liquid flow control.

16.3.2.2.6 Liquid flow pressure indicator and transmitter.

1 NOTE: Tank transmitters indicate low and high level alarms while tank switches indicate low-low and high-high levels.

16.3.2.2.7 Mass flow measurement and transmitter.

16.3.2.3 All tanks are at atmospheric pressure and pressure is not measured. Temperature of liquids is ambient and is not measured in the ACS and SDS tanks. Temperature is measured in the BRA tanks to provide input to the temperature compensating level indicators. Flows to the tanks are not measured. Liquid level monitoring and alarms in the Agent Collection and Spent Decontamination Tanks are provided by either an ultrasonic level transmitter or a radar level transmitter.

16.3.3 Agent Collection Tank System

16.3.3.1 Air-operated diaphragm pumps are used to pump agent from the Explosive Containment Rooms and the Munition Processing Bay (MPB) to the ACS tanks in the Toxic Cubicle (TOX). The agent drain line downstream of the Rocket Shear Machines[2] and upstream of the agent pumps (ACS-PUMP-108 and -109) contains a filter and a small receiving tank (ACS-TANK-103 and ACS-TANK-104). Once the rocket is punched, the valve located near the top of the receiver tank is opened to allow agent to be drawn into the tank. (The agent pump runs continuously during rocket processing and the vacuum of the agent quantification system (AQS) is controlled by opening and closing isolation valves.) The AQS differential pressure transmitter indicates when the draining process has been completed and measures the volume of agent in the receiver tank. The transfer of agent to ACS-TANK-101 or ACS-TANK-102 after quantification and verification is accomplished by closing the valve near the top of the receiver tank and opening valves at the bottom of the receiver tank after each rocket is processed. The same quantification and verification control scheme is used for the Mine Machine.

16.3.3.2 Agent collected from bulk munitions at the bulk drain stations is routed to ACS-TANKS-101 or 102 via an unpocketed line to agent pumps ACS-PUMP-114 and 115. Accompanying the drain process is a bubbler type level measurement system that indicates the drain status of the munition when the maximum amount of agent is drained. The drain/bubbler probe is purged with air to remove any residual agent before retraction from the munition. The amount of agent removed from the munition is quantified by weighing the munition before and after the draining operation is completed.

16.3.3.3 Three air-operated diaphragm agent pumps, ACS-PUMP-105, 106, and 107, pump agent drained from the munitions to either ACS-TANK-101 or 102. Operation of these agent pump(s) induces a vacuum in the AQS system that is controlled by opening and closing isolation valves. The vacuum enables the draining of agent from the munitions. Accompanying the drain process is a bubbler type level measurement system that indicates when the drain process is complete.

[2]Note: When an ECR is converted from the configuration necessary for rocket processing to a configuration for processing a different munition, the AQS system and associated ancillary equipment will be removed. The enclosed description of the rocket system AQS is not affected since future campaigns (e.g., VX rockets) may call for reinstallation of the AQS system.

16.3.3.4 ACS-TANK-101 and ACS-TANK-102, the agent holding tanks, are the primary tanks for demilitarization operations. When a tank has been selected to fill and the system is placed in automatic, the inlet valve is opened and draining is permitted to proceed. In order to allow draining of agent to be initiated, an inlet valve must be open and the corresponding tank cannot be at a high level (corresponding to the maximum allowable volume of 500 gallons for ACS-TANK-101 and 1130 gallons for ACS-TANK-102). If these conditions do not exist for one of the tanks, no additional munitions shall be drained. Should both tanks reach their high-high levels, all draining activities shall automatically cease. An alarm shall sound in the control room if either tank reaches its high-high level. Once draining activities are discontinued because of lack of storage volume, demilitarization processing shall not begin until one of the tanks has sufficient capacity to collect the drained agent. When the tank is filled to a preset level, a high-level alarm sounds in the control room to alert the operator. If the level in the tank continues to rise until a high-high level is reached, the control system automatically closes the inlet valve to the tank and stops draining operations.

16.3.3.5 The venting of agent tanks is controlled by pressure differentials without the need for manual switching of vents. Vapors from the agent tanks escape through a conservation breather vent on ACS-TANK-102, still within the TOX. The TOX is a level A area and is maintained at negative pressure. Vapors passing through the conservation breather vent will combine with TOX ventilation air and be drawn through the exhaust carbon filter units.

16.3.3.6 In the event of a rapid pressure buildup, such as during a fire, the vent is sized large enough to handle the expected agent vaporization rate. A rupture disk, rated at 15 psig and vented to the TOX, is installed on ACS-TANK-101. The rupture disk is located in a nozzle.

16.3.3.7 Adjacent to the rupture disk, in a separate nozzle, is a vacuum relief valve set at 10 psia. If agent is pumped from the tank at a rate faster than it is supplied to the tank by the drain station, a vacuum in the tank may develop. This vacuum relief valve allows air to pass into the tank from the TOX. It does not vent air out of the agent tanks.

16.3.3.8 Downstream of the strainers, the discharge lines from the ACS-TANK-101 and ACS-TANK-102 combine in a common line to the agent feed pump header. Two Liquid Incinerator (LIC) agent feed pumps and a spare are provided. Each of the operating agent feed pumps has a flow control loop that recirculates agent from the pump discharge line to the pump inlet header. During normal operation, agent will be continuously recirculated in the flow control loops since the design flow rate is lower than the rated capacity of the pumps. Pressure safety valves are provided with each pump to recirculate agent from the pump discharge to the pump inlet if the pressure at the pump discharge reaches a specified setpoint. These pressure safety valves protect the pumps in case a downstream control or manual valve is closed. When an Automatic Waste Feed Cut-Off occurs, the agent feed pump providing feed to the effected LIC is shut down and a shutoff valve in the agent line is closed.

16.3.3.9 A mass flow element, pressure-indicating transmitter, low pressure switch, and shutoff valve are located on each agent line prior to penetration into the primary LIC room. These instruments indicate low flow or low pressure in the agent line. If low flow is sensed in the agent line downstream of the agent pump, an alarm will sound in the control room and the agent line shutoff valve is closed. When low pressure occurs in the agent line an alarm will sound in the control room, the online pump is shut down and the spare pump is started. If a low-low pressure is sensed in this line, the corresponding agent feed pump is stopped.

16.3.3.10 A low pressure switch and two tight shutoff valves are also located on the agent line inside the primary LIC Room. If a low pressure is sensed in the agent line upstream of the primary LIC, an alarm will sound in the control room and a signal is sent to the corresponding LIC flame safety shutdown system. In addition, the shutoff valves are closed, thereby stopping flow to the incinerator. The length of agent piping from the last shutoff valve to the incinerator inlet (where the agent tank system terminates) is minimized.

16.3.4 Spent Decontamination Tank System

16.3.4.1 Each SDS tank has one vent to the SDS Room in order to maintain the tank at atmospheric pressure. To allow for initiation of spent decontamination solution pumping, an inlet valve to a SDS tank must be open and the tank cannot be at high level. If these conditions do not exist, pumping is not initiated. When a tank has been selected to fill and the system is placed on automatic, the inlet valve is opened and pumping is permitted to progress.

16.3.4.2 When the tank is filled to a preset level, the system switches automatically to the second tank unless that tank indicates a maximum capacity level or the contents of the second tank are being fed to the secondary chamber of one of the LICs. If the second tank indicates a high maximum capacity level, or the contents of the second tank are being fed to one of the LICs, the inlet valves to both filled tanks are closed and pumping operations are halted. In addition to an alarm sounding during this condition, the control system automatically closes the inlet valve to the tank and stops pumping operations. The third tank shall be held in reserve to provide emergency storage in case there is an agent spill.

16.3.5 Brine Reduction Area Tank System

16.3.5.1 The BRA tank system is composed of four brine storage tanks that feed BRA process lines. Each brine storage tank has one inlet for feed from the Pollution Abatement Systems (PASs) and two pump recycle feed lines.

16.3.5.2 Startup of the incinerators (both LICs, Deactivation Furnace System (DFS), and Metal Parts Furnace (MPF)) and subsequent pumping of the brine from its PAS to the brine surge tanks require that an outlet valve be closed (draining from tank) and that the tank is not at high-high level. This will satisfy the interlock and the inlet valve may be opened. When a tank has been selected to fill and the system is placed on automatic, the inlet valve is opened, and pumping is permitted to progress. When the tank is filled to the high level, the programmable logic controller (PLC) closes the inlet valve as well as annunciates this condition to the Control Room Operator (CRO). This high level alarm prompts the CRO to prepare the next tank to be filled. This condition (closed inlet valve) can be bypassed by the CRO and filling can resume until the high-high level is reached. The high-high level is hard-wired and cannot be bypassed by the CRO. When an inlet valve closes, the PASs have approximately 10 minutes of surge capacity within which the CRO must select another brine tank to fill. If this operation is not successful (e.g., the remaining three BRA tanks indicate high-high level, or two tanks indicate high-high level and one is draining), the level will continue to rise until it reaches the high-high level on the tank selected. At this point, an alarm sounds and an interlock stops feed to the MPF, DFS, and both LICs.

16.3.5.3 If all of the BRA tanks are at high-high level, the LICs are immediately placed in an idle state. This procedure shuts off the agent and spent decontamination solution feeds to both LICs, reduces the production of brine, but keeps the LIC system in an idle condition for an easy restart. Idle conditions are continued until the levels in the BRA tanks are such that the LICs can resume operation. During LIC idle conditions, brine generation is minimized.

16.3.5.4 The BRA tanks are protected from overfilling by level switches that close the brine inlet valves upon reaching high-high level. In the event of instrument failure, tank overflow outlets to the secondary containment system are provided. Brine feed pumps are protected from suction supply loss by low-low level switches on the brine storage tanks. These switches shut down the brine feed pumps. Pre-alarms are provided for all feed system shutdowns.

16.3.5.5 Brine is pumped from the BRA tanks through parallel “basket type” strainers on each suction line to the BRA evaporators and/or drum dryers for processing.

16.3.5.6 The brine system also has a pump and associated piping used to load transport tankers. This piping ties into a plastic lined pipe that exits the Process Utilities Building (PUB) to the pipe rack west of the PUB. This pipe continues south in the overhead pipe rack. This pipe enters a pipe trench that goes under the double fence to a load/unload station. The brine is loaded into tankers which are transferred to an off-site TSDF for further treatment and ultimate disposal. The pipe trench is concrete lined with removable roof sections. The pipe trench floor and loading dock floor area and sump are coated with a chemical resistant coating. The plastic lined pipe is equipped with weep holes. These weep holes are connected to a common header. This header drains to a sump. If liquid is indicated in the sump an alarm is activated in the control room. The same piping system may be used to transfer GB sodium hydroxide-based spent decontamination solution to a tanker truck parked at the load/unload station for shipment off site. The piping used to transfer the GB spent decontamination solution and brine shall be flushed with a minimum of 365 gallons of process water after each transfer to prevent contamination of brine with spent decontamination solution. The rinse water from the flush shall be managed as a hazardous waste and shall be transferred to the tanker in the load/unload station, then added to the spent decontamination solution in the tanker and shipped off site if the requirements of Attachment 2 (Waste Analysis Plan) have been met.

16.3.5.7 In the event the on-site treatment capacity of the BRA is exceeded or the BRA is inoperable, TOCDF will transport the scrubber brine to a pre-approved off-site TSDF for disposal per the TOCDF Waste Analysis Plan.

16.4 PLANS AND DESCRIPTION OF THE DESIGN, CONSTRUCTION, AND OPERATION OF THE SECONDARY CONTAINMENT SYSTEM FOR EACH TANK SYSTEM [40 CFR 264.193(a)-(f) and 270.16(g)]

16.4.1 This section addresses the containment and detection of releases for the three tank systems: ACS (Section 16.4.5), SDS (Section 16.4.6), and BRA (Section 16.4.8). Each subsection supplies information on one of the tank systems.

16.4.2 Secondary containment systems are designed, installed, and operated to prevent any migration of wastes out of the system at any time and are capable of detecting and collecting releases and accumulated liquids until the collected material is removed. Secondary containment systems are constructed of compatible materials, placed on an acceptable foundation or base, provided with a leak-detection system, and sloped or otherwise designed to remove spills or leaked wastes.

16.4.3 Specific information on the design and construction of the secondary containment system for each tank system is maintained at the site and is available for inspection upon request. Attachment 11 contains the process flow diagrams, piping and instrumentation diagrams, and other information on the three tank systems.

16.4.4 Secondary containment for all storage tanks in the tank systems is provided by sumps under the tanks, or dikes or vaults around the tanks. Secondary containment for all of the primary containment sumps that are regulated through this Permit is provided by using the external liner concept. The secondary containment system is described for each tank in each system.

16.4.5 Agent Collection Tank System

16.4.5.1 ACS-TANK-101 and ACS-TANK-102 are located in the TOX on the first floor of the MDB. The MDB is designed to contain an accidental release of agent within the structure.

16.4.5.2 The floor of the TOX is sloped to a depressed area and that to a 500-gallon sump. The secondary containment volume of the containment trench and sump is approximately 2,000 gallons. Because the TOX is located inside a building, there is no run-on or infiltration expected, and no increase in containment volume is required for these factors.

16.4.5.3 The ventilation system is designed to act as a key element in the confinement of agent by operating and maintaining the MDB at a negative pressure. The interior faces of the exterior walls are sealed to protect the external environment. The same sealing procedure is applied to ventilation ducting and instrumentation lines that penetrate the walls. Agent monitors will detect any agent leaks from Category A areas through the walls or ventilation systems. The material used to provide sealing of the surfaces and joints of the floors, walls, ceilings, and wall penetrations are Plastite Protect Coating No. 7122 with Primer No. 7100, Epoloid No. 5-65 with Primer No. 7-W-20, and Epoloid Mastic No. 5-E-84. These materials are described in the specifications which are maintained at the site. Equivalent or superior materials may be used in accordance with Condition II.L.

16.4.5.4 The TOX is located aboveground, inside a building, and is not subject to hydraulic pressure, so the requirement for the exterior moisture barrier to prevent migration of moisture into the vault is not applicable.

16.4.6 Spent Decontamination Tank System

16.4.6.1. SDS-TANK-101, -102, and -103 are located in the SDS Room next to the TOX on the first floor of the MDB. The floor of the SDS Room is sloped to a containment area and a secondary containment sump. The containment volume is approximately 3,000 gallons. This volume is greater than the capacity of the largest tank. Because the SDS Room is located inside a building, there is no run-on or infiltration expected and no increase in containment volume is required for these factors.

16.4.6.2. Spent decontamination solutions are collected from the MDB sumps. There are 22 on the first floor, 3 on the first floor platform, 34 on the second floor, and 5 on the second floor platform. (See Table 4 in the Tables Section of the Permit for a listing of 24-Hour Intermittent Collection Units (ICUs).) Secondary containment for all of the 24-Hour ICUs in the spent decontamination holding tank system is addressed by applying the external liner concept. Generally, each 24-Hour ICU is of welded steel construction and is surrounded by an external concrete liner. Because all of the tanks and associated external liners are in the same building, the specific aspects of the external liner requirements are duplicated throughout this tank system. These aspects are addressed in the following paragraphs.

16.4.7 External Liner Common Elements

16.4.7.1 All of the sumps that are used for primary containment in the spent decontamination holding tank system are basically similar. Most sumps are constructed of epoxy-coated welded steel, measure 2.3 feet by 2.3 feet by 2.25 feet, and contain 89 gallons. The sump is surrounded by a cast-in-place, epoxy-coated (Epoloid E or equivalent) external concrete liner. The dimensions of the liner are 2.75 feet by 2.75 feet by 2.38 feet. The capacities of the regulated sumps and liners are shown in Tables 4 and 5.

16.4.7.2 All of the 24-Hour ICUs in the spent decontamination holding tank system are located inside the MDB. There is no run-on or infiltration of precipitation expected inside the building.

16.4.7.3 The external concrete liner is designed to be free from cracks or gaps. The liner has an Epoloid E (or equivalent) epoxy coating to ensure compatibility with the wastes being handled. The liner was monolithically poured as a part of the floor in the MDB and completely contains the sump contained within the liner. The liner is designed and installed to surround the sump completely. The liner will contain any waste material that may leak from the sump and will prevent both lateral and vertical migration of the waste.

16.4.8 Brine Reduction Area Tank System

16.4.8.1 BRA-TANK-101, -102, -201, and -202 are located outside, in a diked area immediately adjacent to the PUB.

16.4.8.2 Secondary containment for all of the tanks in the brine reduction tank system is addressed by applying the vault concept. The diked area surrounding the brine storage/treatment tanks is designed and constructed as a vault. The BRA Tank secondary containment system has a capacity of 47,000 gallons.

16.4.8.3. The construction specifications for the installation required chemical-resistant water stops at all joints in the diked area. The foundation and interior walls of the diked area are sealed with an impermeable Epoloid E (or equivalent) epoxy paint coating.

16.4.8.4. The BRA tank system is located outside aboveground and is not subject to hydraulic pressure because the foundation is located above the high water table, so the requirement for an exterior moisture barrier to prevent migration of moisture into the vault is not applicable. The brine storage tanks are located in a nonporous, epoxy-coated, reinforced-concrete, diked area outside of the Brine Reduction Building. The diked area contains one sump with a sloped bottom and level probe. A vapor barrier and a 4-inch capillary barrier are used below the vault bottom to resist surface water intrusion.

16.4.8.5 There is a sump and sump pump located at the load/unload station. The sump provides secondary containment for any leakage from the equipment in the loading area and the pipe trench. The pipe trench drains into this sump. This sump is 36 inches wide by 36 inches long by 72 inches deep. The sump is made of 6-inch thick reinforced concrete and covered with steel grate. The sump and pipe trench are coated with a chemical resistant epoxy. The sump has a capacity of 400 gallons. Liquid collected in the pipe trench and the sump is transferred and managed in accordance with Module IV. The sump is pumped to a transport tanker for subsequent disposal. The sump is equipped with a level indicating monitor. If liquid is indicated in the sump an alarm is activated in the control room.

16.5 TANK AGE DETERMINATION [40 CFR 264.191(b)(4)]

16.5.1 The three TOCDF hazardous waste tank systems were fabricated after January 12, 1988 and each underwent a Facility Construction Certification approved by the Division of Solid and Hazardous Waste. Therefore the requirements of 40 CFR 264.191 are not applicable.

16.6 TANK SYSTEM SECONDARY CONTAINMENT REQUIREMENTS [40 CFR 264.193(b)-(e) and 270.16(g)]

16.6.1 Earlier in this section, the external liner and vault concepts were used to describe secondary containment for each one of the hazardous waste storage tanks at the installation. Each system is described in terms of the specific requirements for external liner and vault systems given in 264.193(e). This section addresses the general requirements for secondary containment systems. It is intended to supplement the specific information presented in Section 16.4, titled Plans and Description of the Design, Construction, and Operation of the Secondary Containment System for Each Tank System.

16.6.2 Each secondary containment system is designed, installed, and operated to prevent any migration of wastes outside of the system. The external liner and vault concepts that have been described perform this function for the hazardous waste storage tanks at the facility. In the event of a spill or leak, the waste material will be collected in a sump in the area. Pumpable quantities of agent will be transferred directly to the ACS tanks. Non-pumpable quantities of agent will be decontaminated according to the procedures in Attachment 9 (Contingency Plan) and transported to the SDS tanks. The incinerator pollution abatement system brines will be transported to the BRA tanks. There are no underground hazardous waste storage tanks.

16.6.3 The secondary containment systems are capable of detecting and collecting releases until the material can be removed. The specific discussion for each secondary containment system gives the containment volume. This volume is larger than the tank for which secondary containment is being provided. The method of detecting releases from the tanks is discussed in Section 16.7, titled Tank System Leak Detection Requirements.

16.6.4 Secondary containment systems are lined with compatible materials and have the strength and thickness to prevent failure from pressure gradients, physical contact with the waste, climatic conditions, and the daily stresses of operation. The external liner and vault systems previously described meet these criteria. The external liners and floors, walls, sills, and other components of the vaults are covered with an impermeable epoxy coating as specified in the construction specifications which are maintained at the site. Specifically, the sump was constructed of mild steel. Both the sump and sump liner are coated with an epoxy paint system, as described in the specifications which are maintained at the site. This paint system has been approved by the Army for protection of coated surfaces against corrosion by agents or spent decontamination solutions. Chemical-resistant water-stops of virgin poly-vinyl chloride or rubber with adequate tensile strength, elongation, resistance to applicable chemicals, and aging are used for all vault joints. The exterior moisture barrier used is a 19-mil-thick polyethylene sheeting.

16.6.5 The external liners for the sumps in the spent decontamination holding tank system are constructed of reinforced concrete and are designed for maximum inside head and outside active pressure. The bearing on the soil with the sump and liner is within the allowable soil-bearing capacity. The external liners are designed to withstand any settlement or uplift. The weight of the sump and liner is such that there is a factor of safety of 1.5 against uplift from hydraulic pressure. Other equipment and piping are designed to withstand internal pressures. The equipment is designed for pressures that are at least 10 percent above the maximum operating pressures and is listed to 1.5 times the maximum pressure per the American National Standards Institute.

16.6.6 Climatic conditions have been taken into account for the BRA tank secondary containment system that is located outdoors. Adequate protective coatings have been specified for the outdoor components in the specifications which are located at the site. Additional protection of piping and equipment from climatic conditions is provided by specifying minimum design temperatures, as well as insulation and/or heat tracing. The stresses of daily traffic, including nearby vehicular traffic, have been considered in the design of the secondary containment systems.

16.6.7 The installation is not located near major traffic routes. The only nearby traffic is from installation vehicles. These vehicles will not adversely impact the integrity of the secondary containment systems.

16.6.8 All of the secondary containment vaults are located on sound foundations that are capable of providing support to the tank systems. Information on the structural aspects of the external liner and vault systems is located in the specifications which is located at the site.

16.6.9 The secondary containment sump systems are provided with a leak-detection system that will detect (within 24 hours) the failure of the primary or secondary containment structure or releases of any waste. Further information on detection of releases is given in subsequent sections on leak detection for both the tank systems (Section 16.7) and ancillary equipment (Section 16.9).

16.6.10 The secondary containment sump system external liners and vaults are sloped or otherwise designed to remove accumulated liquids. In most cases, the accumulated liquids flow to the bottom of the sloped area. Sump pumps then pump the accumulated liquid to the SDS tanks before incineration in the LICs. Alternatively, the GB sodium hydroxide-based spent decontamination solution may be shipped off site if the requirements of Attachment 2 (Waste Analysis Plan) have been met.

16.6.11 The design standards for construction of the secondary containment systems are located at the site. Certain features of the secondary containment systems have been specifically designed for the TOCDF. These features utilize applicable parts of commonly accepted industrial design standards as the best available standards, even though these standards have not been written specifically for the applications proposed in this Permit. The General Painting specification which is maintained at the site, and available for inspection upon request, is applicable to all features of the secondary containment system. The specification for Concrete Work for Building Construction is maintained at the site, and is applicable for construction of the secondary containment sumps, vaults, and the liner surrounding the sumps (24-Hour ICUs). The specification for Expansion Joints, Construction Joints, and Waterstops is maintained at the site, and is applicable to the waterstops required for vaults. The Specification for Miscellaneous Metal Work is maintained at the site, and is applicable to the construction of the 24-Hour ICUs.

16.7 TANK SYSTEM LEAK DETECTION REQUIREMENTS [40 CFR 264.193(b)(2), (c)(3), and (e)(1)(iii)]

16.7.1 Secondary containment systems are capable of detecting and collecting releases and accumulated liquids until the collected material is removed. The containment system is provided with a leak detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours. The external liner and vault systems used for secondary containment for the three tank systems and ICUs meet these requirements.

16.7.2 The principles of the leak detection system are similar for the ACS tanks, SDS tanks, and sumps inside the MDB. There is an agent monitoring system installed throughout the facility. This system monitors the ambient air for the presence of agent and is a primary indicator of agent releases. This monitoring system is described in more detail in Attachment 22 (Agent Monitoring Plan).

16.7.3 The sumps below the agent collection and spent decontamination holding tanks will contain any tank leakage. Tank leakage is detected by a decrease in the level of material in the tank, as well as by the level indicators and alarms in the sumps below the tanks. These level indicators are displayed in the Control Room.

16.7.4 Regulated sumps at the facility are configured with a level indicator which is provided with an alarm and a sump pump. These level indicators and alarms provide another method of leak detection. Any rise in sump level is cause for operator attention. The sump levels and operating status of the sump pumps for the agent collection and spent decontamination holding tank systems are displayed in the Control Room. From here, the control room panel indicates which sump level is increased, and the operator determines whether there is an operational explanation for the rise in sump level, such as general housekeeping duties, equipment wash down, or other process activities that might impact the sump level. Leaks or releases would be detected by the sump alarms and level indicators and would appear as a rise in sump level without an accompanying operational explanation. The sump levels and sump pump operating status for the BRA are displayed on a control panel in the area.

16.7.5 Secondary protection for 24-Hour ICUs and primary sumps is provided by the external concrete liner concept. Each liner is equipped with a probe to detect any leakage into the liner. The liners are normally empty and the presence of material in the concrete liner is an indication of leakage from the metal sump. Any leakage is detected by the level indication for the liner and by the inspection of process sumps. The bottom of the liner is sloped to the level sensor. The level sensor is screwed into a coupling that is welded into the mounting flange for the sump. Material collected in the external liner is removed by inserting a dip pipe into the liner through a coupling that is welded on the support flange for the metal sump. The material is then pumped to the SDS tanks for incineration in the secondary combustion chamber of the LICs. Alternatively, the GB sodium hydroxide-based spent decontamination solution may be shipped off site if the requirements of Attachment 2 (Waste Analysis Plan) have been met. The liner is then decontaminated, as necessary, and triple-rinsed. All rinsing materials are collected and disposed of in the LICs.

16.7.6 Each sump is visually inspected when waste is present, for the presence of liquids as described in Attachment 5 (Inspection Plan).

16.8 ANCILLARY EQUIPMENT SECONDARY CONTAINMENT REQUIREMENTS [40 CFR 264.193(f) and 270.16(g)]

16.8.1 Secondary containment has been provided for all ancillary equipment, with only a few exceptions, such as equipment that is inspected for leaks on a daily basis. This equipment include aboveground piping (exclusive of flanges, joints, valves, and other connections); welded flanges, joints, and connections; sealless or magnetically coupled pumps; and pressurized aboveground piping systems with automatic shutoff devices.

16.8.2 The ancillary equipment associated with the three hazardous waste storage tank systems at the installation have the necessary secondary containment features. Secondary containment for each tank system is addressed in the following paragraphs.

16.8.3 Secondary containment for ancillary equipment in the Agent Collection and the Spent Decontamination Holding Tank System relies on the external liner concept. These two tank systems are totally contained within the Munitions Demilitarization Building where all ancillary equipment is provided with secondary containment in the same manner as the tank systems. This description is given in Section 16.4, Plans and Description of the Design, Construction, and Operation of the Secondary Containment System for Each Tank System. The series of sumps, trenches, and external liners provides secondary containment for the ancillary equipment in the same manner as for the tanks themselves.

16.8.4 Secondary containment within Category A areas is provided by Primary Containment Sumps which are located for containment of leaks from agent piping. Piping from the ACS tanks to the LICs stays within Category A areas.

16.8.5 Secondary containment for ancillary equipment associated with the BRA tanks relies on the vault concept and the use of welded pipe with daily inspections for leaks. The ancillary equipment located in the diked area outside and the ancillary equipment located within the BRA are provided with secondary containment in the same manner as the BRA tanks. The diked area around the BRA tanks and the BRA are vaults. A more detailed description of these vault systems is given in Section 16.4, Plans and Description of the Design, Construction, and Operation of the Secondary Containment System for Each Tank System. The BRA tank system also includes the brine transfer line, which brings the brine solution from the PAS area to the BRA. The brine transfer line is constructed of welded pipe and inspected for leaks daily. When flanges are required, piping is routed in an epoxy-coated trench with a grate cover so that full view of the piping is available for inspection purposes. Inspection procedures are given in Attachment 5 (Inspection Plan). The piping specifications are maintained at the site and are available for inspection upon request.

16.8.6 Secondary containment for the ancillary equipment associated with the brine loading station partially relies on the vault concept. The portion of the pipe line that is above ground is visible and is inspected daily for leaks. The portion of the pipe line that is in the pipe trench is equipped with weep holes. These weep holes are connected to a common header. This header drains to a sump. The pipe trench concrete and sump are coated with a chemical-resistant epoxy coating.

16.9 ANCILLARY EQUIPMENT LEAK DETECTION REQUIREMENTS [40 CFR 264.193(f) and 270.16(g)]

16.9.1 Leak detection is provided for all ancillary equipment in a similar manner as described for secondary containment Section 16.7. The ancillary equipment associated with the four hazardous waste storage tank systems at the installation has the necessary leak detection features. Leak detection for all tank systems is addressed in the following paragraphs.

16.9.2 Leak detection for ancillary equipment in the ACS, SDS, and BRA tank systems relies on the agent monitoring system and the level indicator alarm and sump pump in each sump at the facility. This leak detection system is described in more detail in Section 16.7, titled Tank System Leak Detection Requirements. The principles remain the same. The agent monitoring system monitors the ambient air for the presence of agent and the level indicators and alarms sound when sump level changes. This level change is investigated, and the operators determine whether the level change is a result of a process operation or some other cause. The one exception to this leak detection system is the brine transfer line. This line, which brings brine from the PAS to the BRA, is constructed of welded pipe and is inspected for leaks at least once during each operating shift, as explained in Section 16.8 and given in Attachment 5 (Inspection Plan). Piping specifications are maintained at the site and are available for inspection upon request.

16.10 TANK SYSTEM MANAGEMENT PRACTICES [40 CFR 264.194(b) and 270.16(c) and (d)]

16.10.1 Management of Incompatible Wastes in Tanks

16.10.1.1 The design of the facility allows for brines from the PAS to go to the BRA tank system, spent decontamination solutions from the sumps to go to the SDS, and agent from the demilitarization machines to go to the ACS. In addition, agent contaminated fluids (hydraulic fluid, fuel oil, lubricating oil, etc.) from a spill or maintenance activities can be transferred to the SDS after the fluid has been decontaminated. These fluids will be transferred to the ACS tanks prior to treatment in the primary combustion chamber of the LICs. These miscellaneous liquid wastes, if placed in the SDS and ACS tanks, must be compatible with any other fluids within these tank systems. All PAS brines from all of the incinerators are compatible because the pollution abatement systems are the same for each incinerator and they use the same scrubbing material (e.g., sodium hydroxide). When changing from one agent to another, the ACS tanks are rinsed with decontamination solution to remove any residual agent. The spent decontamination solution is then drained from the ACS tanks and pumped to an SDS tank for subsequent processing through one of the LIC secondary chambers. Alternatively, the GB spent decontamination solution may be shipped off site if the requirements of Attachment 2 (Waste Analysis Plan) have been met.

16.10.2 Management of Ignitable or Reactive Wastes in Tanks

16.10.2.1 Agent, brine and spent decontamination solutions have flash points that classify them as Class IIIB liquids in accordance with the National Fire Protection Association. Additionally, agent contaminated fluids (hydraulic fluid, fuel oil, lubricating oil, etc.) from a spill or maintenance activities, can be stored in the SDS Tanks and the ACS tanks prior to treatment in the primary combustion chamber of the LICs. These are not unstable or reactive liquids as defined by the National Fire Protection Association. The BRA tanks are in full compliance with National Fire Protection Association requirements. The agent collection and spent decontamination holding tanks are located in the TOX and SDS Room, respectively, which are provided with a containment volume that is in excess of the largest tank capacity. The brine holding tanks are located outdoors within a diked containment area capable of containing the full contents of one of these tanks. All tank systems are located at least 50 feet away from the property line of the facility.

16.10.3 General Operating Requirements

16.10.3.1 The environmental effects of a release from the rupture disc and conservation breather vent on the agent collection system storage tanks are minimized by design, rather than procedures. The ventilation filter system contains any vapors that are released. Liquid releases are contained in the sump and drainage systems. Leak protection is addressed in Section 16.7, titled Tank System Leak Detection Requirements and Attachment 5 (Inspection Plan). Corrosion protection is addressed in Section 16.2, titled External Corrosion Protection of the specifications which is maintained at the site and is available for inspection upon request.

16.10.3.2 Should there be a release to the secondary containment system of agent, brine, or spent decontamination solution, the area would be cleaned up expeditiously and, in any case, within 24 hours. The spill is collected in an appropriate sump and pumped to a similarly classified tank. The floors in the area are sloped to encourage spill runoff into the sumps. Cleanup includes collecting the spilled material and, if necessary, rinsing the area with decontamination solution to minimize agent contamination. All sumps and equipment in the area of the release would then be rinsed with process water. All of the rinses, both spent decontamination holding and process water, are pumped to the spent decontamination holding tanks before disposal in the LICs. Alternatively, the GB spent decontamination solution may be shipped off site if the requirements of Attachment 2 (Waste Analysis Plan) have been met. After the cleanup of the release and the rinsing, there would be a small amount of residual process water remaining in the sumps.

16.10.3.3 Wash downs are frequent occurrences, especially in the Toxic Maintenance Area where wash downs are routine in the decontamination of contaminated parts that are in need of repair.

16.10.3.4 Specific procedures for an agent spill or leaked waste in the nontoxic areas (Categories C, D, and E) of the MDB are addressed in Attachment 9 (Contingency Plan).

16.10.3.5 Specific procedures for spills, leaked wastes, and precipitation outside of the MDB are addressed in Attachment 9 (Contingency Plan).

16.10.3.6 Any tank system or secondary containment system from which there is a spill or leak is removed from service immediately. All material flows into the tank are stopped. The system is inspected to determine the cause of the release. If the release is from a tank system, sufficient waste is removed from the tank system to prevent any further release. If the release is to a secondary containment system, all released materials are removed within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment.

Table 16-1
AGENT COLLECTION SYSTEM STORAGE TANKS

Tanks System		Tank Identification Number	Tank Identification Number
		ACS-TANK-101	ACS-TANK-102
Design Standard		ASME Section VIII Division I	ASME Section VIII Division I
Tank Capacity, gal.		660	1,300
Working Volume, gal.		500 agent, 582 other liquids	1,130
Corrosion Allowance, in.		¼	¼
Calculated Shell Thickness, in.[a]		0.0763	0.0763
Specified Shell Thickness, in.[b]		½	½
Lining Material		None	None
Dimensions:	Diameter, ft	3.5 I.D.	4.5 I.D.
	Height, ft	9.75 incl. domed heads	11.75 incl. domed heads
Design Temperature, °F		150	150
Design Pressure, psig		15	15
Pressure Control		None	None
Vapor Pressure	HD	0.11 mm Hg @ 25° C	0.11 mm Hg @ 25° C
	GB	2.9 mm Hg @ 25° C	2.9 mm Hg @ 25° C
	VX	0.00063 mm Hg @ 25° C	0.00063 mm Hg @ 25° C
Maximum Height of Liquid in Tank (LSHH nozzle)		80% of height from bottom of tank 7'-6" above tangent[d]	80% of height from bottom of tank 8'-9" above tangent[d]
Projected Corrosion Rate Based on NACE Corrosion Survey[c]		0.2 mil/yr	0.2 mil/yr
Tank Spacing, ft		3.5	3.5

Notes:

a. Calculated shell thickness is the minimum thickness necessary to adequately support the liquid in the tanks. It is calculated by taking into account liquid, wind and earthquake loads, design code, and construction material. It does not include corrosion allowances.

b. Specified shell thickness is the corrosion allowance plus calculated shell thickness and then specified at the next larger nominal plate size.

c. Agent is not specifically listed in the National Association of Corrosion Engineer's Corrosion Survey.

d. The tank tangent is the geometric transition where the cylindrical side meets the ellipsoidal bottom, approximately two inches below the head-to-shell weld.

Table 16-2
SPENT DECONTAMINATION HOLDING TANK SYSTEM[a]

Tank System		Tank Identification Number SDS-TANK-101, SDS-TANK-102, and SDS-TANK-103
Design Standard		ASME, Section VIII, Division I
Tank Capacity, gal.		2,300
Working Volume, gal.		2,200
Corrosion Allowance, in.		1/8
Calculated Shell Thickness, in.[b]		0.102
Specified Shell Thickness, in.[c]		5/16
Dimensions:	Diameter, ft	6.0 I.D.
	Height, ft	11.5 incl. domed bottom
Design Temperature, °F		150
Design Pressure, psig		15
Pressure Control		None
Vapor Pressure		0.6 psia @ 85° F
Maximum Height of Liquid in Tank		9 ft-5 in. from bottom tangent of tank
Projected Corrosion Rate Based on RISUN Technologies Design Assessment Report, October 1997		0.002 to 0.004 inch per year
Tank Spacing, ft		3.5

Notes:

a. The above data is for the unlined carbon steel tanks used during the GB campaign. Before sodium hypochlorite decontamination solution is used in the VX and mustard campaigns, these tanks will be equipped with a 3/16 inch polyvinyl chloride liner that increases the corrosion allowance accordingly and the corrosion rate is therefore projected to be negligible. A skeletal system consisting of four Titanium rings has been placed inside the tank to ensure the stability of the liner.

b. Calculated shell thickness is the minimum thickness necessary to adequately support the liquid in the tanks. It is calculated by taking into account liquid, wind and earthquake loads, design code. and construction material. It does not include corrosion allowances.

c. Specified shell thickness is the corrosion allowance plus calculated shell thickness and then specified at the next larger nominal plate size.

Table 16-3 **BRINE STORAGE TANK SYSTEM**		
Tank System		Tank Identification Number BRA-101, 102, 201 and 202
Design Standard		API 650
Tank Capacity, gal.		47,000
Working Volume, gal.		42,900
Corrosion Allowance, in.[a]		¼
Calculated Shell Thickness, in.[a,b]		0.0507
Recommended Shell Thickness, in.		3/8
Lining Material		Epoxy
Dimensions:	Diameter, ft	20
	Height, ft	20
Design Temperature, °F		185
Design Pressure, psig		15
Pressure Control		None
Vapor Pressure		4.4 psia @ 160° F
Maximum Height of Liquid in Tank		18 ft 3 in. from bottom of tank
Projected Corrosion Rate Based on NACE Corrosion Survey		None with liner
Tank Spacing, ft		5

Notes:

a. Calculated shell thickness is the minimum thickness necessary to adequately support the liquid in the tanks. It is calculated by taking into account liquid, wind and earthquake loads, design code. and construction material. It does not include corrosion allowances.

b. Specified shell thickness is the corrosion allowance plus calculated shell thickness and then specified at the next larger nominal plate size.